



HOW TO INSTALL GLASS MOSAIC, SUGGESTIONS FROM LATICRETE

Summary of installation procedures and adhesives

1.14 DELIVERY, STORAGE AND HANDLING

- A. Acceptance at Site: deliver and store packaged materials in original containers with seals unbroken and labels, including grade seal, intact until time of use, in accordance with manufacturer's instructions.
- B. Store Glass tile and installation system materials in a dry location; handle in a manner to prevent chipping, breakage, and contamination.
- C. Protect latex additives, organic adhesives, and epoxy adhesives from freezing or overheating in accordance with manufacturer's instructions; store at room temperature when possible.
- D. Store Portland cement mortars and grouts in a dry location.

1.15 PROJECT/SITE CONDITIONS

- A. Provide ventilation and protection of environment as recommended by manufacturer.
- B. Prevent carbon dioxide damage to installation mortars, adhesives, grouts, and ceramic tile by venting temporary heaters to the exterior.
- C. Maintain ambient temperatures not less than 50 F (10 C) or more than 100 F (38 C) during installation and for a minimum of seven (7) days after completion. Setting of Portland cement is retarded by low temperatures. Protect work for extended period of time and from damage by other trades. Installation with Latex Portland cement mortars requires substrate, ambient and material temperatures at least 37° F/3° C. There should be no ice in slab. Freezing after installation will not damage Latex Portland cement mortars. Protect Portland cement based mortars and grouts from direct sunlight, radiant heat, forced ventilation (heat & cold), and drafts until cured to prevent premature evaporation of moisture. Epoxy mortars and grouts require surface temperatures between 60°F/16°C and 90°F/32°C at time of installation. It is the General Contractor's responsibility to maintain temperature control.

2.4 MORTAR, GROUT AND ADHESIVE MANUFACTURER

- A. Mortar, grout, adhesive supplied by LATICRETE INTERNATIONAL, Inc., 1 Laticrete Park North, Bethany, CT 06524-3423 USA Phone 800-243-4788

NOTE TO SPECIFIER: Use either the following performance specification or the proprietary specification.

2.5 MATERIAL PERFORMANCE SPECIFICATIONS

- A. Latex Portland Cement Mortar for Thick Bed Mortars, Screeds and Leveling Beds to be weather, frost, shock resistant meeting the following physical requirements:
 - 1. Compressive strength: Thick bed, Screeds
& Leveling mortars 5000 psi (34.5 MPa) Min. (ANSI A118.4.)
 - 2. Water absorption: 5% Max. (ANSI A118.6)

3. Smoke & Flame contribution factors: 0 (ASTM E84 – Modified)
- B. Latex Portland Cement Thin Bed Adhesive Mortar or Multipurpose Thin Set Mortar to be weather, frost, shock resistant meeting the following physical requirements:
1. Compressive strength: 5000 psi (34.5 MPa) Min. (ANSI A118.4)
 2. Bond strength: 500 psi (3.5MPa) Min. (ANSI A118.4)
 3. Water absorption: 4% Max. (ANSI A118.6)
 4. Smoke & Flame contribution factors: 0 (ASTM E84 – Modified)
- C. Latex Portland Cement Grouting Mortar to be weather, frost, shock resistant meeting the following physical requirements:
1. Compressive strength: 3500 psi (24 MPa) Min. (ANSI A118.6)
 2. Water absorption: 5% Max. (ANSI A118.6 – Modified)
 3. Smoke & Flame contribution factors: 0 (ASTM E84 – Modified)
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- D. Epoxy Adhesive to be stainproof, chemical resistant 100% solids epoxy with high temperature resistance and meeting the following minimum physical requirements:
1. Compressive strength: 4500 psi (31 MPa) Min. (ASNI A118.3)
 2. Shear Bond Strength: 1000psi (6.9MPa) Min. (ANSI A118.3)
 3. Water Absorption: 1/2% Max. (ANSI A118.3)
 4. Service Temperature: up to 230°F (110C°)
 5. Cured Epoxy Adhesive to be chemically and stain resistant to ketchup, mustard, tea, coffee, milk, soda, beer, wine, bleach (5% solution), ammonia, juices, vegetable oil, detergents, brine, sugar, cosmetics, and blood and chemically resistant to dilute acids and alkalis, gasoline, turpentine, and mineral spirits.
- E. Epoxy Grout (residential) shall be non-toxic, non-flammable, non-hazardous during storage, mixing, application and when cured and shall meet the following minimum physical requirements:
1. Compressive Strength 6600 psi (464 kg/cm²) min. (ANSI A118.3)
 2. Shear Bond Strength 100 psi (70kg/cm²) min. (ANSI A118.3)
 3. Water Absorption 1/2% max. (ANSI A118.3)
 4. Service Temperature up to 230°F (110°C)
 5. The finished Epoxy Adhesive or grout to be chemically and stain resistant to ketchup, mustard, tea, coffee, milk, soda, beer, wine, bleach (5% solution), ammonia, juices, vegetable oil, brine, sugar, cosmetics, and blood and chemically resistant to dilute acids and alkalis, gasoline, turpentine, and mineral spirits.
- F. Modified Emulsion Epoxy Adhesive & Grout shall be non-flammable, water resistant, epoxy adhesive and meet the following physical requirements:
1. Density 110lbs/cu.ft. (1762 kg m³) (ANSI A118.8)
 2. Compressive Strength >3,500 psi (24MPa; 246 kg/cm²) (ANSI A118.8)
 3. Bond Strength >750 psi (5MPa; 53 kg/cm²) (ANSI A118.8)
 4. Flame contribution factor 0 smoke (ASTM E-84 Modified)
 5. Tile Council of America Service Rating Extra Heavy
- G. Sound Control/Acoustical Underlayment to be load bearing, shock and vibration resistant and meeting following physical requirements:

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| 1. | Compressive Strength Modified) | 600lbs./in. ² (42.2kg/cm ²) (ASTM C109) |
| 2. | Point Loading Strength 81) | 5000lbs./in. ² (351.6kg/cm ²) (LIL – 1007-81) |
| 3. | Installed Weight (dry)(at 1/2" thickness) Modified) | <3lbs./ft ² (14.7kg/m ²) (ASTM C905) |
| 4. | Fire Rating | Non-Combustible (ASTM E84 Modified) |
| 5. | Complete Floor/Ceiling Assembly to meet the following requirements with no suspended ceiling: | |
| a. | Sound Transmission Class (STC) | ≥52 (ASTM E413-73) |
| b. | Impact Insulation Class (IIC) | ≥51 (ASTM E492-73) |
| c. | Impact Noise Rating (INR) | ≥0 (FHA 750/HUD TS28) |
| 6. | Submit manufacturer's documentation from an independent testing laboratory verifying compliance with this specification when installed on a 4" (100mm) concrete slab. Manufacturer to be regularly engaged in production of these materials for minimum 10 years and demonstrate three (3) similar installations of minimum of five (5) years successful service. | |

2.6 INSTALLATION SYSTEM ACCESSORIES PERFORMANCE SPECIFICATIONS

- A. Waterproofing membrane to be thin, cold applied, single component liquid, load bearing and non-toxic. It shall be certified by IAPMO as a shower pan liner. Reinforcing fabric to be non-woven rot-proof specifically intended for waterproof membrane. Materials to be non-toxic, non-flammable, and non-hazardous during storage, mixing, application and when cured. Equal to LATICRETE 9235 Waterproof Membrane manufactured by LATICRETE International, Inc. and meeting following physical requirements:
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| 1. | Water Permeability(at 30ft.hydro/0.9 atmos/91.2kPa) | Nil (Fed. Spec. TT-C-00555 Modified) |
| 2. | Elongation at break | 20-30% (ASTM D751) |
| 3. | Service Temperatures | -20°to+280°F(-28°to +137°C) (LIL 1016-92) |
| 4. | Tensile breaking strength | 2950psi (20.4MPa;207kg/cm ²) (ASTM D751) |
| 5. | Thickness | 20 mils (0.5mm) (LIL 1013-92) |
| 6. | Bond strength | 250 PSI (1.72 MPa) (ANSI A118.4) |
| 7. | Service Rating (TCA) | Extra Heavy |
- B. Reinforcing Mesh: 2 inch x 2 inch (50 x 50 mm) x 16 ASW gage or .0625 inch (1.5mm) diameter galvanized steel welded wire mesh complying with ASTM A185 and ASTM A82 except for minimum wire size.
- C. Cleavage membrane: 15 pound asphalt saturated, non-perforated roofing felt ASTM D226, or 4.0 mils /0.1 mm thick polyethylene plastic film ASTM D4397
- D. Joint Sealant: as specified in Section 07920.
- E. Cementitious backerboard units: size and thickness as specified, comply with ANSI A118.9
- F. Thresholds: Provide marble saddles complying with ASTM C503 requirements for exterior use and abrasion resistance in compliance with ASTM C241 in color, size, shape and thickness as indicated on drawings.

NOTE TO SPECIFIER: Edit / add applicable accessory products.

2.8 MORTAR, GROUT, ADHESIVE & ACCESSORY FOR OPTIONAL PROPRIETARY PRODUCT SPECIFICATION

- A. Installation system components as manufactured by LATICRETE International, Inc. Bethany, CT 06524 USA. Phone 800-243-4788
- B. Latex-Portland cement leveling bed/scratch and render coat mortar: LATICRETE 226 Thick Bed Mortar gauged with LATICRETE 3701 Mortar Admix as manufactured by LATICRETE International, Inc.
- C. Latex-Portland Cement Thick Bed Mortar: LATICRETE 226 Thick Bed Mortar gauged with LATICRETE 3701 Mortar Admix as manufactured by LATICRETE International, Inc.

- D. Sound Control/Acoustical Underlayment: LATICRETE 18 Sound Control Underlayment (Standard or Plus Configuration); as manufactured by LATICRETE International, Inc.
- E. Waterproof Membrane- Liquid Applied: LATICRETE 9235 Waterproof Membrane or LATAPOXY 24hr Hydroproofing Membrane; as manufactured by LATICRETE International, Inc.
- F. Crack Suppression and Anti-Fracture Membrane: LATICRETE Blue 92 Anti-Fracture Membrane; as manufactured by LATICRETE International, Inc.
- G. Chemical resistant, water cleanable, tile setting epoxy adhesive: LATAPOXY 300 Epoxy Adhesive as manufactured by LATICRETE International, Inc.
- H. Modified Epoxy Emulsion Mortar: LATAPOXY® 210 Modified Epoxy Adhesive as manufactured by LATICRETE International, Inc.
- I. Latex-Portland Cement Mortar: LATICRETE 254 Pt Platinum Multipurpose Thin Set as manufactured by LATICRETE International, Inc.
- J. Latex-Portland Cement Mortar: LATICRETE 211 Crete Filler Powder gauged with LATICRETE 4237 Latex Thin Set Mortar Additive as manufactured by LATICRETE International, Inc.
- K. Latex-Portland Cement Mortar: LATICRETE 272 Premium Floor 'N Wall Thin Set Mortar gauged with LATICRETE 3701Mortar Admix as manufactured by LATICRETE International, Inc.
- L. Latex-Portland Cement Mortar: LATICRETE 220 Marble & Granite Mortar gauged with LATICRETE 3701Mortar Admix as manufactured by LATICRETE International, Inc.
- M. Latex-Portland Cement Mortar: LATICRETE 272 Premium Floor 'N Wall Thin Set Mortar gauged with LATICRETE 333 Super Flexible Additive as manufactured by LATICRETE International, Inc.
- N. Dry-Set Portland Cement Mortar: LATICRETE 272 Premium Floor 'N Wall Thin Set Mortar as manufactured by LATICRETE International, Inc.
- O. Chemical resistant, water cleanable grouting epoxy: LATICRETE SpectraLock Grout or LATAPOXY SP-100 Stainless Epoxy Grout for Floors n' Walls or LATAPOXY 2000 Industrial Epoxy Grout (INDUSTRIAL) as manufactured by LATICRETE International, Inc.
- P. Polymer Modified Tile Grouts for Tile Installation: LATICRETE Tri-Poly Fortified Sanded Grout (1500 Series) or LATICRETE Tri-Poly Fortified Unsanded Grout (1600 Series) gauged with LATICRETE 1776 Admix Plus Microban, as manufactured by LATICRETE International, Inc.
- Q. Roof Deck System; LATICRETE Plaza & Deck System
- R. Spot Bonding; LATAPOXY 310 Stone Adhesive – Standard or Rapid Grade
- S. LATICRETE Latasil Silicone Sealants –LATASIL NS

PART 3 - EXECUTION

3.1 SUBSTRATE EXAMINATION

- A. Verify that floor or wall surfaces to be covered with waterproofing, glass tile, mosaics, pavers, trim units or thresholds are:
 - 1. Sound and conform to good design/engineering practices; rigid, with maximum deflection of L/360 distributed uniformly over the span
 - 2. Concrete cured a minimum of 28 days at 70 degrees F/20 degrees C with a saturated surface dry (SSD) condition, including an initial (7) day period of wet curing. NOTE: Latex Portland Cement Mortars do not require a minimum cure time for concrete slabs or mortar beds
 - 3. Concrete wood float finished, or better, if the installation is to be done by the thin bed method over concrete, light steel trowel finished
 - 4. Clean and free of dirt, oil, grease, sealers, curing compounds, form oil or loose plaster, paint, and scale.
 - 5. Level and true to within:
 - a. Walls: 1/8in./3mm in 8ft./2.5m;
 - b. Floors: 1/16in./1.5mm in 3ft./1m (organic adhesive 1/8in./3mm in 10ft./3.0m (mortars, epoxies) for thin bed applications directly over substrate or thin, load bearing waterproof membrane; not leveled with gypsum or asphalt based compounds; pitched to drains where required.

6. Advise General Contractor and Architect of any surface or substrate conditions requiring correction before tilework commences. Beginning of work constitutes acceptance of substrate or surface conditions.

3.2 SURFACE PREPARATION

- A. Prepare EXISTING FLOORING SURFACES including terrazzo, ceramic tiles, pavers, quarry tiles, vinyl, vinyl composition floor coverings (other than cushion vinyl) to be sound, solid, well bonded, stripped clean and free from dust, wax, grease, sealer and all other contamination which may reduce or prevent adhesion.
- B. CONCRETE SUBSTRATES
- C. PLYWOOD SUBSTRATES
- D. GYPSUM SUBSTRATE

NOTE TO SPECIFIER: *The above are example surface categories; edit for project specific surfaces and conditions.*

3.3 INSTALLATION - ACCESSORIES

- A. CRACK SUPPRESSION – See Manufacturer’s Written Installation Instructions
- B. WATERPROOFING - See Manufacturer’s Written Installation Instructions
- C. ACCOUSTICAL UNDERLAYMENT - See Manufacturer’s Written Installation Instructions

3.4 INSTALLATION – TILE

- A. General: Install in accordance with ANSI A108 Standard for Ceramic Tile installation and TCA Handbook. Cut and fit tiles neatly around corners, fittings, and obstructions. Perimeter tile to be minimum half tile. Chipped, cracked, and split tile and edges, not acceptable. Make joints even, straight, plumb and of uniform width to tolerance +/- 1/16" (1.5mm) over 8ft. (2400mm). Install divider strips at junction of flooring and dissimilar materials.
 - B. Thin Bed Method (Paper Face Mounted Glass Mosaics): The LATICRETE adhesive shall be prepared by mixing LATICRETE 4237 Latex Mortar Additive with LATICRETE 211 Crete Filler Powder (White) or with LATICRETE 1500 Series Sanded Grout, color to be selected from LATICRETE Color Grout Card, and shall be applied to the surface masonry surface to be tiled with a with notched trowel to work installation materials into good contact with tile substrate. A trowel having “V” notches approximately 3/16” x 3/16” (4mm x 4 mm) is recommended. In addition, the colored adhesive shall be placed onto the backside of each sheet of glass mosaic tile with the flat side of the trowel immediately before placement of the sheet into the freshly troweled adhesive on the surface to receive the tile work. Spread only as much mortar/adhesive as can be covered in 20-30 minutes or while mortar/adhesive surface is still wet and tacky. Tile shall then be set in place and rapped or beaten gently with a grouting float to ensure 100% full bedding and a true surface. Tile shall be aligned to show uniform joints and then allowed to set until firm, approximately 20 – 40 minutes. The face of the sheets of the paper-faced mosaics shall then be dampened and the paper removed. Excess adhesive must be cleaned from the surface of the tile with a wet cloth or sponge while the adhesive is fresh. (Rear Mounted Tiles can be installed in the same manner – without the process of removing the paper facing)
 - C. Thick Bed Method (Vertical Surfaces, Prefloat Method): Trowel weather resistant, latex-Portland cement scratch/plumb coat mortar over wire lath, concrete or masonry; Float surface of scratch coat plumb/true and set until firm.
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- D. Thick Bed Method (Horizontal Surfaces; Over Cleavage Membrane):
1. Verify that allowance for minimum bed thickness of 2 in/50 mm has been made;
 2. Install cleavage membrane complying with ANSI A108.1 (A-2Materials, A-4.1.5.3);
 3. Place mortar bed to a depth approximately one-half (1/2) finished bed thickness; Lay 2 x 2 in/50 x 50 mm, 16 x 16 ga.(1.5mm), galvanized, welded reinforcing wire fabric complying with ANSI A108.1(A-2 Materials, A4.1.5.3) and ASTM A 185 over mortar; Place additional latex-Portland cement thick bed mortar over wire fabric and compact mortar by tamping with flat trowel; Screed mortar bed level and provide correct slopes to drains; Spread latex-Portland cement mortar with flat trowel over surface of "green"/fresh mortar bed as a slurry bond coat approximately 1/16in./1.5 mm thick; Apply slurry bond coat to back of ceramic tile, mosaic, paver, trim unit or threshold and place each piece/sheet while slurry bond coats are wet and tacky; Beat with a hardwood block or rubber mallet to level/imbed tilework before mortar bed takes initial set; Clean excess mortar/adhesive from tile surfaces.
- E. Thick Bed Mortar (Horizontal Surfaces; Directly Bonded):
1. Verify 1 in./25 mm nominal bed thickness has been allowed;
 2. Apply latex-Portland cement mortar with flat trowel as a slurry bond coat approximately 1/16in./1.5mm thick over clean concrete slab or load bearing LATICRETE waterproof membrane; Place latex-Portland cement thick bed mortar over slurry bond coat while bond is wet and tacky; Omit reinforcing wire fabric and fully compact bed by tamping;
- F. Grout/Pointing Joints: (Rear Mounted Tiles or Paper Face Mounted Tiles using the 2 step method of tile installation) Verify grout joints are free of dirt, debris or tile spacers; follow manufacturer recommendations for minimum cure time prior to grouting. Sponge or wipe dust/dirt off tile faces and remove water standing in joints; Apply grout release to face of absorptive, abrasive, non-slip or rough textured ceramic tile, pavers, bricks, or trim units that are not hot paraffin coated to facilitate cleaning; Pack joints full and free of voids/pits with rubber grouting float; "Squeegee" excess grout from tile faces using edge of rubber float and diagonal strokes (at 45° angle to direction of joints); Cleaning Portland cement grouts - Pull/drag towel or sponge diagonally across tile faces/joints to remove remaining grout film and allow tile work to dry. Hardened grout film or haze should be removed within 24 hours. Cleaning epoxy grouts - follow manufacturers specific guidelines for cleaning epoxy grout installations. Epoxy film or haze must be removed within 24 hours with a detergent wash; do not use acid cleaners on epoxy grout less than 7 days old. Grout / Pointing of Joints (Paper Face Mounted Tiles using the one step method of tile installation): Touch up grouting of the tile work can be accomplished once the installation mortar has become firm and the face mounted sheets of paper have been removed. Joints shall be grouted with LATICRETE 1500 Series Sanded Grout (color to be same as used for setting) fortified with LATICRETE 1776 Grout Admix Plus Microban. Joints shall be packed full and free of all voids and pits. Excess grout shall be cleaned from the surface as the work progresses, while grout is fresh and before it hardens. The day after installation, the grout film or haze shall be removed using a detergent solution. No acids should be used for cleaning glass mosaic tile work.

NOTE TO SPECIFIER: select one of following and specify color for each type/color of ceramic tile, mosaic, paver, trim unit:

1. chemical resistant, water cleanable grouting epoxy as per Paragraph 2.05 D or E or 2.08 H (for interior installation of virtually any type of tile, with grout joints 1/16in./1.5mm wide and larger);
2. latex-portland cement sanded floor grout as per paragraph 2.08 I & J for joint widths 1/16in./1.5mm to 3/8in./10mm);
3. latex-portland cement unsanded grout as per Paragraph 2.08 I & J (for interior installations of absorbent/non-vitreous type tiles, soft glazed tiles and soft/polished marble tile with joints widths 1/8 in./3 mm or less;

- G. Expansion and control joints: Provide control or expansion joints in width and depth as located and detailed on contract drawings and conform to architectural details. Existing joints in concrete subfloors to carry through to surface of tile work. Make joints through tilework at least as wide as structural joints in substrate below. Install expansion joints where tile abuts restraining surfaces such as perimeter walls, curbs, columns, wall corners, etc., and directly over cold joints and control joints in structural surfaces. Locate interior expansion joints a maximum of 24' x 24' (8m x 8m). Locate exterior expansion joints a maximum 16' x 16' (5m x 5m). Rake or cut through tile setting bed to substrate expansion joints.
1. Follow the Tile Council of America's detail "EJ-171 Expansion Joints".
 2. Fill joints with packing material as specified in Section (07920).
 3. LATASIL Silicone Sealants – (Select one of the following grades) LATASIL SP, LATASIL NS, LATASIL HD

NOTE TO SPECIFIER: Optimum ratio of joint layout, length to width, is 1:1, and not greater than 2:1. Consult sealant or premanufactured joint system manufacturer for recommendation of expansion joint based on project tile.

- H. ADJUSTING: Correction of defective work for a period of (1) year(s) following substantial completion, return to job and correct all defective work. Defective work includes, without limitation, tiles broken in normal abuse due to deficiencies in setting bed, loose tiles or grout, and all other defects which may develop as a result of poor workmanship or defective materials.
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3.5 CLEANING

- A. Clean excess mortar from surface with water as work progresses. Perform cleaning while mortar is fresh and before it hardens on surfaces. Take care to not contaminate joints while cleaning prior to grouting. Sponge and wash tile diagonally across joints. Polish with clean dry cloth. Remove grout haze following recommendation of mortar additive and epoxy manufacturer. Do not use acids for cleaning. Upon completion, remove all surplus materials and leave premises broom clean.

3.6 PROTECTION

- A. Protect finished installation under provisions of Section (01500.) (01535.) Close areas to other trades and traffic until tile being installed has set firmly. Keep traffic off horizontal Portland cement thick bed mortar installations for at least 72 hours at 70°F/21°C.
- B. Keep floors installed with epoxy adhesive closed to traffic for 24 hrs. at 70°F/21°C, and to heavy traffic for 48 hours at 70°F/21°C, unless instructed differently by manufacturer. Use kneeling boards, or equivalent, to walk/work on newly tiled floors. Cure tilework in swimming pools, fountains and other continuous immersion applications for 7-10 days at 70°F/21°C before flood testing or filling installation with water. Extend period of protection of tilework at lower temperatures (below 60°F (15°C) and at high relative humidity (>70% R.H.) due to retarded set times of mortar/adhesives. Replace or restore work of other trades damaged or soiled by work under this section.

Trend Group thanks Laticrete Corp. for the cooperation and the possibility of using their specifications.